

Some observations on distribution of *Scoparia dulcis* Linn. in India¹

BY

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Scoparia dulcis L. a member of tribe Gratioleae and family Scrophulariaceae is an undershrub with small white flowers and little capsules full of minute seeds. The plant is distributed throughout the tropical regions of both the hemispheres. Pennel (1935) reports that it is a widespread weed of lowland tropical America, occurring in waste places and cultivated ground, specially where sandy. It occurs through the Florida peninsula to southern Georgia, and along the Gulf coast to southern Louisiana. Pennel (1943) further observes that the genus *Scoparia* has about 20 neotropical species, of which *Scoparia dulcis* is adventive to the old world tropics ; it is one of the commonest tropical weeds. ‘*Scoparia dulcis* Linn. is the only species occurring in our area (India)’ (Chatterjee & Bharadwaj 1955). It is a weed of cultivated and waste lands.

According to Ridley (1930) *S. dulcis* was first described in 1753 by Linnaeus from specimens collected in Jamaica and Curaçao ; it is undoubtedly of South American and West Indian origin. Linnaeus did not give the etymology of the name, but it is evidently from the Latin *Scopae*, meaning broom, an allusion to the habit of the plant (Pennel 1935).

Ridley (1930) reports that ‘J. Rotheram, a pupil of Linnaeus, who died in 1804, has written in his copy of Linnaeus “Species Plantarum”, a manuscript note to the effect that the plant was used in Guinea, West Africa, as a drug for venereal diseases’. This shows that the plant had arrived in Guinea much before 1804 ; ships connected with the slave trade might have carried the plant from South America. Loureiro saw this plant in Indo-China in 1773, perhaps brought by Jesuit missionaries as a drug. The plant was found by Robert Brown in Australia in Shoal Waterbay on the north-east coast in 1802. From Hong Kong the plant was reported in 1853 and 1856, and was used by natives as a drug for consumption. The earliest record of this plant from Malay Peninsula

¹ Experimental work was done at the Department of Botany, Banares Hindu University, Varanasi.

is 1884. The Malayans call it 'TeMacao' (Macao Tea), implying that it came from China (Ridley 1930).

Ridley (1930) visualises two secondary centres of dispersal of this plant. *Scoparia dulcis* first migrated from West Indies to Africa in the 18th century; then the Jesuits, either accidentally, or in cattle fodder or as a drug, carried it from South America to the Philippines and from there through cattle to Malay Archipelago and Malay Peninsula and to China. The cause of its absence in India in the earlier part of the 19th century may be due to the fact that there was no cattle trade from either Africa or Malaya to this country.

S. dulcis was reported in India in 1845 by Voigt at Serampore (Fischer 1921), though Fischer (1932) himself in the list of the specimens at Kew Herbarium observes that Thompson collected the plant in July, 1843, at Moradabad in the United Provinces (now Uttar Pradesh).

Fischer (1921a) remarked: 'apparently this little plant has spread from Serampore since 1845. It has extended throughout the peninsula in suitable localities; have met with it in Ganjam, Coimbatore and Malabar. It is increasing in the localities occupied in abundance and it may well become a pest. It is an introduced species that has run wild in the moist western deciduous forest only'. Fischer in 1925 reported the plant on Lushai Hills.

Hooker (1885) observes: 'though now a super-abundant Bengal plant according to Mr. Clarke, it was unknown in Roxburgh's time and occurs in no Indian herbarium except Clarke's. Voigt mentions it (1845) as found about Serampore, whence probably it has spread quite recently'.

Blatter & Hallberg (1918) noted the great rapidity with which this tropical American plant has spread over large areas of India. They also mention that 'Dalzell and Gibson in their BOMBAY FLORA (1861) do not mention the plant'. In 1918 the plant was to be found all over Bombay Island.

It is called a Bengal plant, perhaps because of its dispersal from Bengal. Whatever may be the exact date and place of its first report, it is certain that this plant had come to India by the middle of the nineteenth century.

In the later part of the nineteenth and the early part of the twentieth century the plant became abundant; in less than fifty years the plant spread to nearly all the provinces of India. Cooke (1903-1906) says that 'this weed, a native of tropical America, is becoming naturalised in many parts of India, notably in Bengal.' Woodrow (1897) reports having found it in a salt swamp near Bombay. Duthie (1903-1920) writes: 'often met with as a weed of cultivated ground, more specially in the Sub-Himalayan tracts of Rohilkhand and North Oudh'.

Kirtikar & Basu (1918) do not mention the plant in their INDIAN

MEDICINAL PLANTS (1918 edition), but the 1935 edition says : ' In India it is used in infusion in ague. In Guiana every part of the plant is used as an emetic. As a gargle the plant is used as a cure for toothache. A decoction of the root is given in blennorrhagia and in excessive menstruation. The root is considered astringent, mucilaginous. The Antnanka of Madagascar use an infusion of the leaves in stomach troubles. In Guinea, it is considered diuretic and is a popular remedy for children. On the Gold Coast, the twigs are pounded and mixed with Guinea grain or hire (a white clay) and with water, the liquor being drunk to cure sore throat.' Nath & Banerjee (1948) extracted ' antimellitus principle ' from fresh *Scoparia dulcis* plants and have used with success the decoction of the plant for the cure of diabetes.

It is interesting to observe that this plant came to India in the middle of the nineteenth century, and within about fifty years has become a weed throughout India. What special characteristics the plant possesses that it has become so abundant ?

With a view to examine the potentialities of the plant with regard to its reproductive capacity both sexual and vegetative the following experiments were conducted.

Field observations:

Number of fruits per plant, number of seeds per capsule and weight per seed were recorded from plants of *Scoparia dulcis* collected from different localities in Varanasi. The data have been given in the Table.

TABLE

Capsules per plant	Number of Seeds per capsule	Weight of each seed in mg.
418	275	4.2
590	203	1.5
507	221	4.5
471	280	1.3
339	200	5.0
370	230	3.2
Average 449	235	3.3

$$\text{Seed output} = 449 \times 235 = 105515$$

100 seeds were put between moist filter papers on 12th February 1964, and after 6 days 95 seeds had germinated. Thus the percentage germination was 95%.

The reproductive capacity (Salisbury 1942) may be indicated as

$$\frac{\text{Seed output} \times \text{percentage germination.}}{100}$$

Accordingly the reproductive capacity of *Scoparia dulcis*

$$= \frac{105515 \times 95}{100} = 100239.25 \text{ or } 100239.$$

The seedlings were seen in nature in the month of July and August; plants attain their normal size within two or three months. After flowering and fruiting the capsules dehisce and the seeds are dispersed by wind.

In nature very small plants also bear fruits and these plants were found to have sprouted from underground parts perennating under the soil. The vegetative propagation of *S. dulcis* takes place by sprouting of axillary buds; one single piece of underground stem may give rise to one or more aerial shoots.

The plant is equipped with very efficient method of dispersal and high reproductive capacity. This sexual method of propagation is supplemented with perennation and regeneration of vegetative parts under the soil which also gives rise to adult fruiting plants.

DISCUSSION

Salisbury (1942) has shown that *Linaria vulgaris* Mill., a member of Scrophulariaceae possesses the capacity of reproduction by seeds and regeneration by vegetative means. He is of the opinion that though the viability of the seeds is low, yet its local abundance is due to prolific means of vegetative multiplication by adventitious shoots from the roots. The latter fact has been confirmed in the same plant by Bakshi & Coupland (1960). Shah (1966) has shown in the case of *Bacopa monnieri* that seeds are not the effective means of reproduction but the regeneration of a single node or a single leaf with an axillary bud has facilitated the plant for migration from coastal sea shores to inland fresh water. Thus *Scoparia dulcis* possesses both efficient migratory mechanism with high viability of seeds supplemented by regeneration by vegetative means; these may be the causes of the widespread distribution of the plant in India within a short period of time.

SUMMARY

Scoparia dulcis Linn., a member of the family Scrophulariaceae, is distributed throughout the tropical regions of both the hemispheres. A historical sketch of its distribution has been attempted. The plant was first reported in the middle of the nineteenth century in India and

within fifty years it has become a common weed. The widespread distribution and local abundance of *S. dulcis* can be explained by the efficient migratory mechanism, high reproductive capacity and prolific method of regeneration by vegetative means.

ACKNOWLEDGEMENTS

The author acknowledges with grateful thanks the valuable guidance and help of Prof. R. Mishra, F.N.I., Head of the Department of Botany, Banares Hindu University, Varanasi. The facilities provided by Rev. Father H. Santapau, Director, Botanical Survey of India, Calcutta, to see the herbarium sheets at the National Herbarium, Calcutta, is acknowledged with thanks.

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